REMARKS

Claims 1, 2, 5-7 and 9-10 have been amended. Claims 4 and 11-17 have been canceled without prejudice or disclaimer. New claims 18-25 have been added. Accordingly, claims 1-3, 5-10 and 18-25 are pending in this application.

35 U.S.C. §112

Claim 8 was rejected under 35 U.S.C. §112 as including insufficient antecedent basis for a limitation. The amendment to claim 1 is believed to traverse the rejection of claim 8 by the addition of the retention period to claim 1.

35 U.S.C. §§102 and 103

Claims 1, 3, 5-6 and 12 stand rejected under 35 U.S.C. §102(b) as being anticipated by Freeman et al., U.S. Patent No. 6,108,285, (hereafter "Freeman"). Claims 2, 4, 7-9 and 16 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Freeman in view of Harding et al., U.S. Patent No. 4,974,156, (hereafter "Harding"). Claims 10, 13 and 17 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Freeman in view of Reed, U.S. Patent 6,542,971. These rejections are traversed as follows.

Under the invention, files are WORM protected as soon as they are stored to disk, even though the volume is not yet filled. This overcomes a problem in the prior art WORM configurations for disk storage systems, whereby a volume was able to

be WORM protected only after the volume was filled, and thus, no WORM protection was provided to files that were stored to the volume before the volume was filled.

Freeman teaches a WORM method and system that uses non-rewriteable optical disks. Freeman addresses a problem in which, when a volume of data is stored on one side of an optical disk, a conventional directory structure cannot be used for this volume because erasure of the data from the directory is impossible (column 1, lines 19-20 and 33-36). Freeman stores a plurality of separate directory groups 130, 140, 160 on the optical media in locations separate from the actual data file areas 150, 170 (see FIG. 3), and includes a pointer to a next or previous path directory block in each path directory group (column 5, lines 61-62). Thus, Freeman does not use a next write pointer to indicate which areas of the volume are write protected and which areas are not write protected, as recited in Applicant's claim 1. Instead, Freeman uses pointers to indicate at which locations on the optical media the directory information is continued for each path directory group.

There are additional areas in the volume of Freeman that are write protected that have nothing to do with the pointers taught by Freeman, namely, data file areas 150, 170. The pointers in Freeman point to a next or previous path directory block (column 5, line 61, through column 6, line 6), or a first block in a new label group (column 5, lines 11-24), but these pointers only indicate next blocks for directory or label information, and do not indicate next blocks for storage of the data itself. For example, Freeman discusses that:

> When a user defines the first path on the WORM volume, file directory group 140 is created for that path. A path directory entry pointing to file directory group 140 is written to path directory group 130. Files having this path name are initially written into data file area 150. Data file area 150 grows as data is written into it. When a second path is defined, data file area 150 is closed and file directory group 160 is created on the WORM volume next to data file area 150, thereby wasting little if any space. Path directory group 130 is updated with a new path directory entry that points to file directory group 160. Data files having this second path name are written into growing data file area 170. If the user now wants a file having the first path name to be written to the disk, a file directory entry is placed in a file directory block in file directory group 140, but the file itself is written into the data file area 170. In this manner, files are associated with file directory entries by a common path name, not necessarily physical location on the disk, although files tend to be relatively close to their associated directory entry. (emphasis added) (See, column 7, lines 19-39, and FIG. 3.)

Thus, Freeman teaches the use of multiple pointers for associating directories for various paths of data. For example, in the excerpt above, Freeman teaches that the pointer added to a directory group 130 points to a later directory group 160. However, none of the pointers disclosed by Freeman function in a manner similar to Applicant's claimed pointer. In particular, none of Freeman's pointers is used to indicate which areas of the volume are write protected and which areas are not, as recited in claim 1, since the pointers of Freeman only point to very limited portions of the data stored. Accordingly, Freeman does not teach or suggest the invention recited in claim 1.

Additionally, it should be noted that Freeman has no need for the system and method of the present invention since, in Freeman's system, the data is write protected as soon as it is written to disk because the disk is a write-once media. On

the other hand, the storage media used in Applicant's invention is rewriteable media, and data stored to the rewriteable media might be overwritten without Applicant's invention. Under Applicant's invention, the pointer is used to prevent data from being changed once it has been written to the volume, and the pointer also indicates when the volume is full so that reduction in the retention period will begin. Further, under Applicant's invention, the WORM protection may be turned off when the retention period expires, thereby enabling the volume to be used to store new data. Freeman provides no teaching or suggestion regarding these features since Freeman's invention is directed to write-once media.

In the Office Action, Harding is combined with Freeman under the premise that Harding teaches a retention period, and that it would be obvious to apply the retention period of Harding to the teachings of Freeman to arrive at Applicant's invention. However, one skilled in the art would not combine Harding with Freeman since Freeman teaches the use of a non-rewriteable storage media. Thus, Freeman has no need of a specified retention period since once the data is written to the storage media of Freeman, it cannot be erased.

Further, even if the combination of Freeman and Harding were proper, this combination still does not teach Applicant's invention. According to Applicant's invention, a retention period is included in the WORM configuration table. When the volume is full (i.e., when the next-write pointer points past the last block in the volume), the retention period is periodically reduced by a unit of time. Then, when

the retention period has expired, the WORM protection is turned off so that the data is no longer write protected, and the storage media may be used again for storage of new data. Neither Harding, nor Freeman, nor any combination thereof teaches such a system or method.

Amended claim 1 includes "a write once read many (WORM) configuration table having a plurality of entries which indicate by use of a next write pointer which of a plurality of areas of said volume are write protected and which of said plurality of areas are not write protected" and also includes that "when the retention period for the data stored on the volume expires, write protection for the data stored on the volume is turned off by updating said WORM configuration table." For the reasons set forth above, these limitations are neither taught nor suggested by Freeman, Harding, or the other art of record, whether taken singly, or in combination. In particular, Freeman does not teach a next write pointer that indicates which areas of a volume are write protected and which are not. Further, even if Harding were properly combinable with Freeman, which it is not, Harding fails to teach turning off a retention period for a volume by updating a WORM configuration table, and with Freeman it is impossible to turn of the write protection. Accordingly, claim 1 is allowable.

Additionally, new independent claim 18, directed to the same embodiment of the invention as claim 1, includes "a next write pointer maintained by said disk controller, said next write pointer pointing to a next block in said volume to which the

data may be stored, wherein any blocks numbered below the next block are write protected by said disk controller, while the next block and any blocks of said volume numbered greater than said next block are not write protected." Freeman fails to teach this since, as discussed above, Freeman allows writing of additional pointer information to older path directory groups, such as updating path directory group 130 with a pointer that points to file directory group 160 (column 7, lines 28-29). Additionally, claim 18 recites that the next write pointer is maintained by the storage controller, whereas in Freeman, the pointers are written to the storage media itself.

Claim 18 further includes that "when said next write pointer points to a block number larger than the highest numbered block of said volume, the disk controller periodically reduces a retention period for the data in the volume by a unit of time until the retention period expires, and wherein when said retention period for the data in the volume expires, the disk controller ends write protection for the volume. Freeman fails to teach anything about a retention period, and the combination of Freeman and Harding does not teach or suggest periodically reducing the retention period when a next write pointer points to a block number larger that the highest block number of a volume. Accordingly, claim 18 is allowable.

In addition, new independent claim 22, directed to the same embodiment as claims 1 and 18, includes "providing a next-write pointer that points to a next block of said consecutively numbered blocks that has not yet been written to, wherein the data is able to be written to the blocks greater than or equal to the next block, but

cannot be written to blocks less than said next block." As discussed above with respect to claims 1 and 18, Freeman fails to teach this.

Claim 22 further includes "reducing the time remaining in said retention period periodically when the next-write pointer points to a block numbered higher than said maximum block", and "disabling write protection for said volume when said retention period expires." As discussed above, the combination of Freeman and Harding fails to teach reducing a retention period periodically when a next-write pointer points to a block numbered higher that a maximum block allocated to a volume. Accordingly, claim 22 is also allowable.

Conclusion

In view of the foregoing, Applicant respectfully requests that a timely Notice of Allowance be issued in this case.

Respectfully submitted,

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